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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,654	09/26/2006	Manfred Buck	MC1-8353	1655

7590 10/07/2011  
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EXAMINER
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LEE, SIN J

ART UNIT	PAPER NUMBER
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1722

MAIL DATE	DELIVERY MODE
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10/07/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/594,654	BUCK ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	SIN LEE	1722	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 5/27/2011 and 7/7/2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 25-35 and 49-53 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☒ Claim(s) 25-35, 52 and 53 is/are allowed.
- 7) ☒ Claim(s) 49-51 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 26 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____.                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                          |

### DETAILED ACTION

1. In view of applicants' argument, previous 102(b) rejection on claims 45-48 (now rewritten as claims 50-53) is hereby withdrawn. As argued by applicants, the reference Rong et al (*Langmuir* 2001, vol.17, pg.1582-1593) does not teach or suggest thermally treating its compound  $\omega$ -(4'-methyl-biphenyl-4-yl)-alkane thiols, and present specification demonstrates, in its Example 1, the *difference in structural properties* of the non-treated  $\omega$ -(4'-methyl-biphenyl-4-yl)-alkane thiols vs. the thermally treated  $\omega$ -(4'-methyl-biphenyl-4-yl)-alkane thiols.

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 49, applicants recite that the SAM has a first less stable structural form prior to heat treatment and a second more stable structural form after heat treatment. It is unclear from present claim language whether applicants are claiming the less stable SAM (before the heat treatment) which will turn to more stable structural form after the heat treatment or claiming the more stable SAM which was produced by the heat treatment from the less stable SAM.

Appropriate correction and/or clarification are required. For the purpose of examining the claim on the merit, the Examiner assumed that the applicants are claiming the more stable SAM which was produced by the heat treatment from the less stable SAM (because applicants also recite in the claim that the SAM comprises domain sizes that exceed  $10^5$  square nanometers, which is the characteristics of the heat treated SAM (see present specification, pg.12, section C)).

***Claim Rejections - 35 USC § 102***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claim 49 is rejected under 35 U.S.C. 102(b) as being anticipated by Myerson (US 2003/0170999 A1).

Myerson teaches self-assembled monolayers with local domain area sizes ranging from  $25 \text{ um}^2$  to  $2500 \text{ um}^2$ . In Fig.1 (see also [0022]), Myerson illustrates

example of self-assembled monolayers of *rigid biphenyl* thiols that can be used as the crystallization domain for his invention. Present specification (pg.4, lines 13-20) states that by means of present invention one can provide *surprising and unexpected features* of the invention, which is *the significantly increased domain size*. Since Myerson's range of 25  $\mu\text{m}^2$  to 2500  $\mu\text{m}^2$  exceeds  $10^5 \text{ nm}^2$ , it is the Examiner's position that Myerson's self-assemble monolayers of rigid biphenyl thiols would accordingly (or inherently) teach present stable SAM (which *is produced by* the heat treatment from the less stable SAM).

***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
8. Claims 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stolowitz et al (US 2002/0192722 A1).

Stolowitz teaches the following in its claims 1-2;

1. A sensor surface, said sensor surface comprising:  
a substrate coated with a free electron metal; and  
a matrix layer disposed on said free electron metal, said matrix layer comprising an organic compound, wherein said organic compound has a boronic acid complexing moiety.
2. The sensor surface of claim 1, wherein said matrix is a self-assembled monolayer, a mixed self-assembled monolayer, or combinations thereof.

Claims 4 and 5 of the reference teach gold as the free electron metal, and as the organic compound having the boronic acid complexing moiety, Stolowitz teaches the following in its claim 6;



(1)

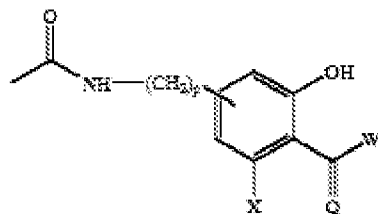
wherein:

X is an anchor group that forms a complex with said free-electron metal;

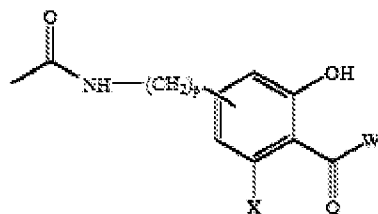
R is an optionally substituted alkylene group optionally interrupted by one or more members selected from the group consisting of a heteroatom, an amide group and combinations thereof; and

Y is a boronic acid complexing moiety.

As examples for the anchor group X, Stolowitz teaches thiol, disulfide and phosphine functional groups (see [0074]-[0076]). Stolowitz teaches that preferably, R is an optionally substituted alkylene group, optionally interrupted by a heteroatom, which is 8-40 carbon equivalents in length (see [0077]). Also, in claim 12, Stolowitz teaches that Y has the following formula;



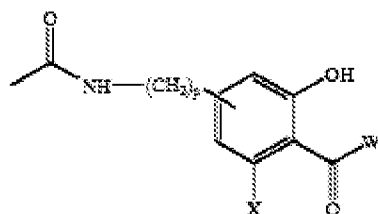
. Based on Stolowitz's such teachings as described above, it would have been obvious to one skilled in the art to obtain Stolowitz's sensor surface comprising a gold substrate and a self-assembled monolayer (disposed on the gold substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 8 carbon atoms and Y is a group of the formula



, with a reasonable expectation of success.

Art Unit: 1722

Also, Stolowitz teaches (see claim 4) that as the free electron metal of claim 1, silver can be used as well. Therefore, it would also have been obvious to one skilled in the art to obtain Stolowitz's sensor surface comprising a silver substrate and a self-assembled monolayer (disposed on the silver substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 9 carbon atoms (since the alkylene group R is taught to have any number of carbon atoms chosen from 8 to 40) and Y is a group of the formula



, with a reasonable expectation of success. Thus,

Stolowitz's teaching renders obvious present inventions of claims 45 and 46 (those claims are product-by-process claims).

### ***Allowable Subject Matter***

9. Claims 25-35 are allowed. None of the cited prior arts teaches or suggests present method of claim 25 which requires the steps (a) and (b). Claims 52 and 53 are allowed. Stolowitz does not teach or suggest present 4-(4'-methyl-biphenyl-4-yl)-alkane-1-thiol of claim 52.

### ***Response to Arguments***

10. With respect to present claim 49, Applicants argue that Myerson does not teach or disclose that his SAMs exhibit two different forms – one less structurally stable which becomes more structurally stable after heat treatment. However, as discussed above, it

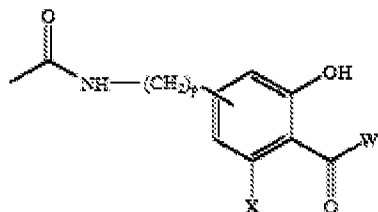
Art Unit: 1722

is the Examiner's assumption that in claim 49 applicants are claiming the more stable SAM which was produced by the heat treatment from the less stable SAM.

Since present specification states that by means of present invention one can provide *surprising and unexpected features* of the invention, which is *the significantly increased domain size* and since Myerson's range of 25  $\mu\text{m}^2$  to 2500  $\mu\text{m}^2$  exceeds  $10^5 \text{ nm}^2$ , it is the Examiner's position that Myerson's self-assemble monolayers of rigid biphenyl thiols would accordingly (or inherently) teach present stable SAM (which *is produced by* the heat treatment from the less stable SAM).

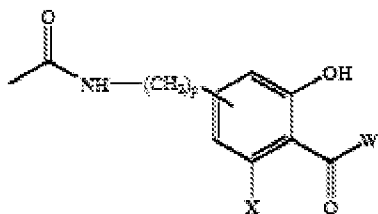
With respect to present claims 50 and 51, applicants argue that the substrate (gold in claim 50 or silver in claim 51) determines the particular choice of the spacer group (an even number of carbon atoms for gold or an odd number of carbon atoms for silver). In other words, applicants argue that the molecular structure should match the substrate in order to produce advantageous bonding geometries. Applicants argue that Stolowitz does not specifically lead a skilled person to those exact combinations of substrates and spacer groups as defined in claims 50 and 51. However, Stolowitz gives *only five examples* for his free electron metal (two of which are gold and silver) and teaches that R is an alkylene group of 8-40 carbon numbers (*half of those numbers being even numbers and the other half of those being odd numbers*). It would have been obvious to one skilled in the art to obtain Stolowitz's sensor surface comprising a gold substrate and a self-assembled monolayer (disposed on the gold substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 8 carbon atoms and Y is a group of the formula





with a reasonable expectation of success, in the absence of showing unexpected superior results of present invention over that of Stolowitz.

Also, it would have been obvious to one skilled in the art to obtain Stolowitz's sensor surface comprising a silver substrate and a self-assembled monolayer (disposed on the silver substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 9 carbon atoms (since the alkylene group R is taught to have any number of carbon atoms chosen from 8, 9, 10 . . . .40) and Y is a group of the formula



with a reasonable expectation of success, in the absence of showing unexpected superior results of present invention over that of Stolowitz.

Although applicants argue that present claims 50 and 51 limit the maximum space group lengths to C9/10 and that the chain lengths of the aliphatic moieties in Stolowitz are too long, Stolowitz's chain length range of 8-40 overlaps with present chain length range of 1-10 and thus renders present range prima facie obvious in the absence of showing unexpected superior results of present invention over that of the prior art. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior

Art Unit: 1722

art,” a prima facie case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Applicants argue that Stolowitz does not teach the transition of the SAM from a less stable structure to a more stable structure. However, present claims 50 and 51 are written in product by process claim language (“wherein said SAM is comprised by aryl or rigid alicyclic moiety species in *a substantially stable structural form derived, in situ, by thermal treatment from a less stable structural form*”): it is still the Examiner’s position that Stolowitz’s sensor surface comprising a gold substrate and a self-assembled monolayer (disposed on the gold substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 8 carbon atoms and Y is a group of the formula shown above, teaches presently claimed substantially stable SAM of claim 50. It is also the Examiner’s position that Stolowitz’s sensor surface comprising a silver substrate and a self-assembled monolayer (disposed on the silver substrate) having an organic compound X-R-Y, in which X is an anchor group of thiol, R is an alkylene group of 9 carbon and Y is a group of the formula shown above, teaches present substantially stable SAM of claim 51.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

Art Unit: 1722

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/

Primary Examiner, Art Unit 1722

October 2, 2011